

## 10 CLIMATE (SUNLIGHT)

### 10.1 Introduction

This section of the Environmental Impact Assessment (EIA) assesses the daylight impact of the proposed residential development, at Kilcarbery Grange comprising of 578no. individual houses, 154no. duplex units and 9 no. apartment blocks totalling 302no. apartment units of 1 – 3 bed types. O'Connor Sutton Cronin (OCSC) Consulting Engineers have been appointed to assess this impact and have undertaken the analysis.

The aim of the analysis is to record and analyse the following impacts: -

- Sunlight impact to proposed amenity spaces within the proposed development;
- Sunlight impact to any amenity spaces adjacent to the development, due to the proposed development.

### 10.2 Assessment Methodology

In considering the development potential and the quality of amenity for the surrounding properties as well as for the new development once the scheme has been implemented, the assessment methodology has been based on the Building Research Establishment (BRE) guidelines on *Site Layout Planning for Daylight and Sunlight (the BRE Guide)*.

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

However, it is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide: -

*"The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines these should be interpreted flexibly because natural lighting [and sunlight] is only one of the many factors in site layout design."*

#### 10.2.1 Sunlight Assessment Methodology

In terms of amenity space, the BRE Guide recommends that for an external amenity space to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive at least two hours of sunlight on March 21<sup>st</sup>.

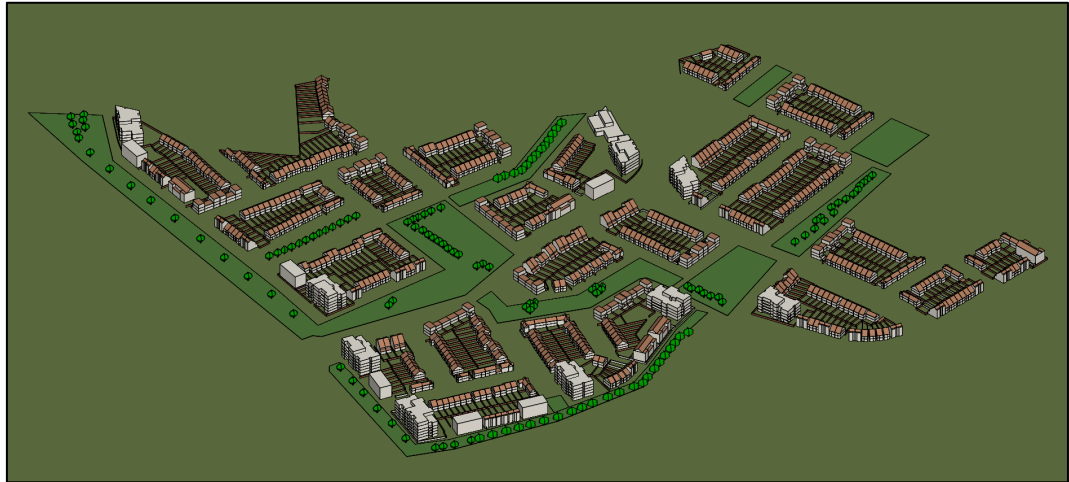
The following amenity spaces represent all applicable amenity spaces within the Kilcarbery Development and have been identified for analysis: -

- Private back gardens for all houses;
- Private balcony areas provided to duplex apartments;
- Private balcony areas provided to apartment blocks;
- Public open space;
  - Oak Green
  - Lime Green
  - Grange Square

In order to analyse the sunlight requirements for the development a detailed 3D model was constructed of the entire development, including properties adjacent to the site, in the Integrated Environmental Solutions Virtual Environment (IES VE) software package. A number of computer simulations were then undertaken in the IES VE software package to ascertain the sunlight hours being achieved.

An image of the model for the proposed development is illustrated in Figure 10.1.

The sunlight impact analysis has been assessed on the entire proposed development including the impacts to existing adjacent amenity spaces external to the proposed development.



**Figure 10.1:** IES VE Model of the Proposed Development.

### 10.3 Receiving Environment

The subject site is located 11km from Dublin City Centre, approximately 1.7km west of Clondalkin Village in South County Dublin, and comprises of greenfield lands, separated by hedgerows and trees. The site is currently unused and has been zoned under the current County Development Plan 2016-1022 for the provision of new residential communities in accordance with the approved plans.

The site is bordered to the west by roadway R136, to the south by the green lands of Corkagh Park, with established residential developments to the North and East of the site.

In addition, permitted PPP development (yet to be constructed) will border the east of the site and has also been considered as present for the assessment.

Figure 10.2 outlines the proposed site.



Figure 10.2: Outline of propped site.

## 10.4 Characteristics of the Proposed Development

### 10.4.1 Proposed Development

The proposed development subject of this SHD Planning Application will generally comprise: -

- 1,034 no. units (578 no. houses, 154 no. duplex / apartments and 302 no. apartments) ranging from 2 to 6 storeys, comprising the following: -
- 578no. own door houses, including: -
  - 449no. 3-bed 2-storey houses (House Type A, A1, A2, B, C, D, G & H).
  - 31no. 4-bed 2-storey houses (House Type E & J).
  - 98no. 4-bed 3-storey houses (House Type F & F1).
- 154no. own door duplex / apartments, in 3 to 4-storey buildings, including: -
  - 41no. 1-bed duplex / apartments (Type M1 & M2).
  - 49no. 2-bed duplex / apartments (Type K, N1 & N2).
  - 64no. 3-bed duplex / apartments (Type L, L1, L2 & L3).
- 302no. apartment units accommodated in 9no. 4 to 6-storey buildings (with own door access ground floor apartments), including: -
  - Block 1 accommodating 29no. apartments (6no. 1-beds, 18no. 2-beds and 5no. 3 beds).
  - Block 2 accommodating 24no. apartments (4no. 1-beds, 15no. 2-beds and 5no. 3 beds).
  - Block 3 accommodating 30no. apartments (13no. 1-beds and 17no. 2-beds).

- Block 4 accommodating 30no. apartments (13no. 1-beds and 17no. 2-beds).
- Block 5 accommodating 45no. apartments (12no. 1-beds, 22no. 2-beds and 11no. 3-beds).
- Block 6 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds).
- Block 7 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds) – Temporary creche at ground floor level to revert 7no. residential units on completion of permanent purpose-built creche in Phase 3.
- Block 8 accommodating 33no. apartments (5no. 1-beds, 23no. 2-beds and 5no. 3-beds).
- Block 9 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds).
- Private rear gardens are provided for all houses. Private patios / terraces and balconies are provided for all duplex and apartment units. Upper level balconies are proposed on elevations of all multi-aspect duplex and apartment buildings.
- Ancillary uses including the provision of 1 no. retail unit (c. 178 sq. m) and community building (c. 785 sq. m).
- 1no. temporary creche (c. 557 sq. m gross floor area in lieu of 7no. ground floor apartment units in Block 7 pending construction of permanent creche at Grange Square)
- 1no. permanent creche building at Grange Square (c. 909 sq. m gross floor area).
- New vehicular access from Outer Ring Road / Grange Castle Road (R136) to the west (left in and left out arrangement) and 2no. new vehicular access points onto Old Nangor Road (L5254) to the north and associated re-alignment of existing adjoining roadways.
- New street network, including spine road (c. 6m in width) extending from Outer Ring Road / Grange Castle Road (R136) to the west onto Old Nangor Road (L5254) to the north.
- New pedestrian and cycle path network.
- Provision of Public Open Space (c. 4.6 Ha) including: -
  - Oak Green Space (c. 7,453 sq. m).
  - Lime Green Space (c. 6,646 sq. m).
  - Grange Square (c. 2,606 sq. m).
- Provision of surface water attenuation measures (SuDs).
- Wastewater pumping station including 18hr storage tank and associated infrastructure.
- 1,510 no. surface car parking spaces.
- 1,105 no. covered bicycle parking spaces.
- Communal bin storage for all terraced houses, duplex / apartment and apartment blocks.
- All associated and ancillary site development, infrastructural, landscaping and boundary treatment works including bin storage.

Figure 10.3 depicts the entire development, whilst Figures 10.4 to 10.6 illustrate the development in three character areas (Sycamore, Oak and Lime) noting the development plot numbers.



Figure 10.3: Proposed Development.

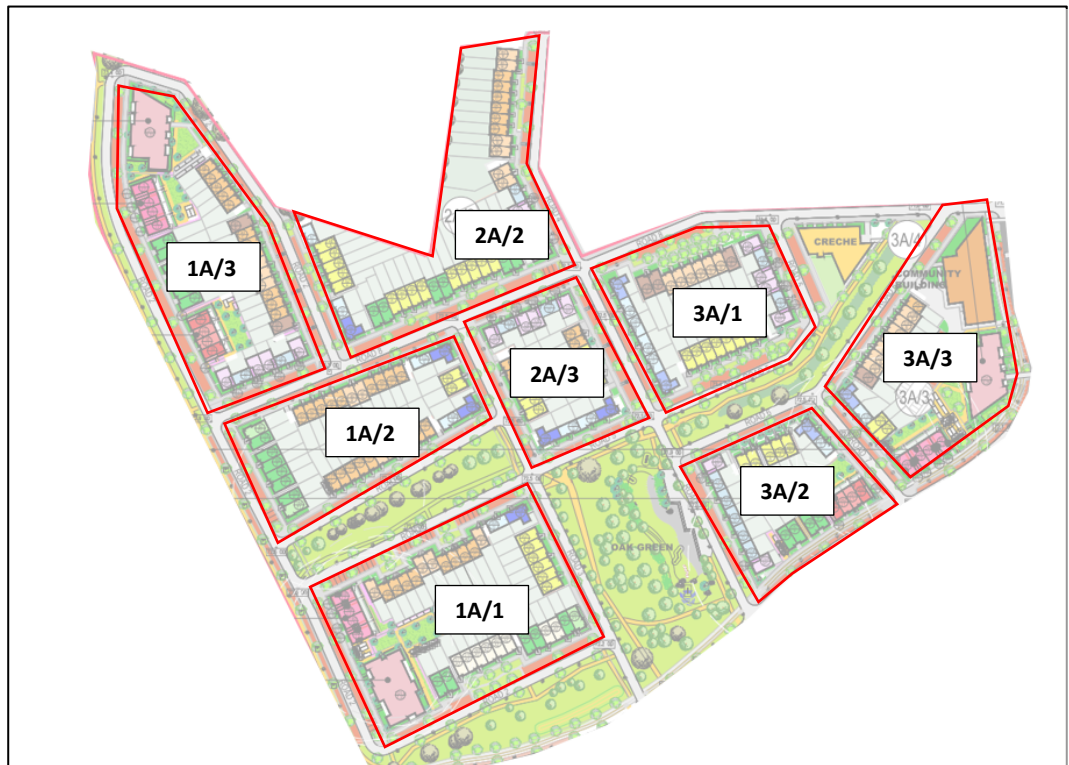


Figure 10.4 – Oak Development



Figure 10.5 – Lime Development



Figure 10.6 – Sycamore Development

**10.4.2 Existing Adjacent Amenity Spaces**

As part of the analysis the impact to the existing adjoining amenity spaces from the proposed development was also analysed. Figure 10.7 highlights existing developments adjacent to the proposed site, with the potential to be impacted by the Kilcarbery Development (Ref 1 - 3).

Table 10.1 below provides further detail on the adjacent developments (Ref 1 - 3), and the impact perceived.



**Figure 10.7 – Properties Adjacent to the Kilcarbery Development**

Reference	Building Reference	Impact Perceived
Ref. 1	Properties along Cherrywood Park	The distance is substantial from the development therefore no impact is perceived.
Ref. 2	Properties along Kilcarberry Ave	No amenity space is present adjacent to the site. All private gardens are to the rear of houses fronting the development, therefore no impact is perceived.
Ref. 3	PPP Site	No amenity space is present adjacent to the site. All private gardens are to the rear of houses fronting the development, therefore no impact is perceived.

**Table 10.1:** Sensitive Receptors.

Based on the information outlined in Table 10.1 above it is considered that there is no impact to surrounding amenity space from the proposed development and further analysis is not required.



## 10.5 Potential Impact of the Proposed Development

This section will consider the potential impact of the proposed development under the following factors: -

- Impacts to the proposed development in relation to sunlight of amenity spaces: -
  - Private gardens
  - Duplex balconies
  - Apartment balconies
  - Open Space

### 10.5.1 Proposed Development

#### 10.5.1.1 Construction Stage

The analysis considers the sunlight impact to amenity spaces within the proposed development. It is considered that during the construction phase there will be no impacts experienced in relation to sunlight.

#### 10.5.1.2 Operational Stage

It is considered that the proposed development has the potential to achieve high levels of sunlight given the site layout and design, including the lower height of the houses and generous areas of amenity space. In addition, the absence of adjacent high-rise buildings that could overshadow the development is a positive for the site.

In order to assess the potential impact of the development during the operational phase, in terms of sunlight access, the methodology outlined in Section 10.1.1 of this Chapter has been followed.

#### **Sunlight Impact Results for Amenity Spaces within the Proposed Development**

In order to fully assess the potential sunlight impact to private amenity spaces, all private amenity spaces throughout the development have been analysed, including private gardens provided to houses, balconies to duplex units and apartments throughout the development.

It should be noted that the site layout has been prepared in line with the Kilcarbery-Grange Masterplan (2017) prepared by South Dublin County Council, and the applicant has engaged with South Dublin County Council whereby the design and layout of the proposed development has been tested against the plan-led requirements of the Masterplan.

The layout has been arranged so that all green open spaces and green loops are fully addressed by residential frontages to ensure a secure public realm with passive overlooking, which has led to the block layout arrangement with varying orientations across the development. North facing amenity spaces have been minimised as far as possible and the net residential density for the site is c. 42no. units per Ha, which is compliant with the Masterplan net residential density range of 35 – 50 unit per Ha.

#### Private Amenity Space

In summary, 82% of private amenity areas receive a minimum of 2 hours of sunlight on the 21<sup>st</sup> March on 50% of the amenity space. Those that fall slightly short of the 50% are predominantly spaces orientated to the north.

Other aspects to consider that contribute to the shortfall are privacy and security requirements for the development. Back garden fencing has been designed as 1.8m high, for privacy and overlooking requirements. It is noted that the fences do impact on sunlight access to the spaces on the 21<sup>st</sup> March given the lower angle of the sun, however in later months where the angle of the sun is higher minimal or no impact from fencing is apparent.

It should also be noted that beyond the 21<sup>st</sup> March sunlight access to private amenity spaces continues to improve and excellent access to sunlight is experienced across the development during summer months when amenity spaces will predominantly be used.

#### Communal Open Space

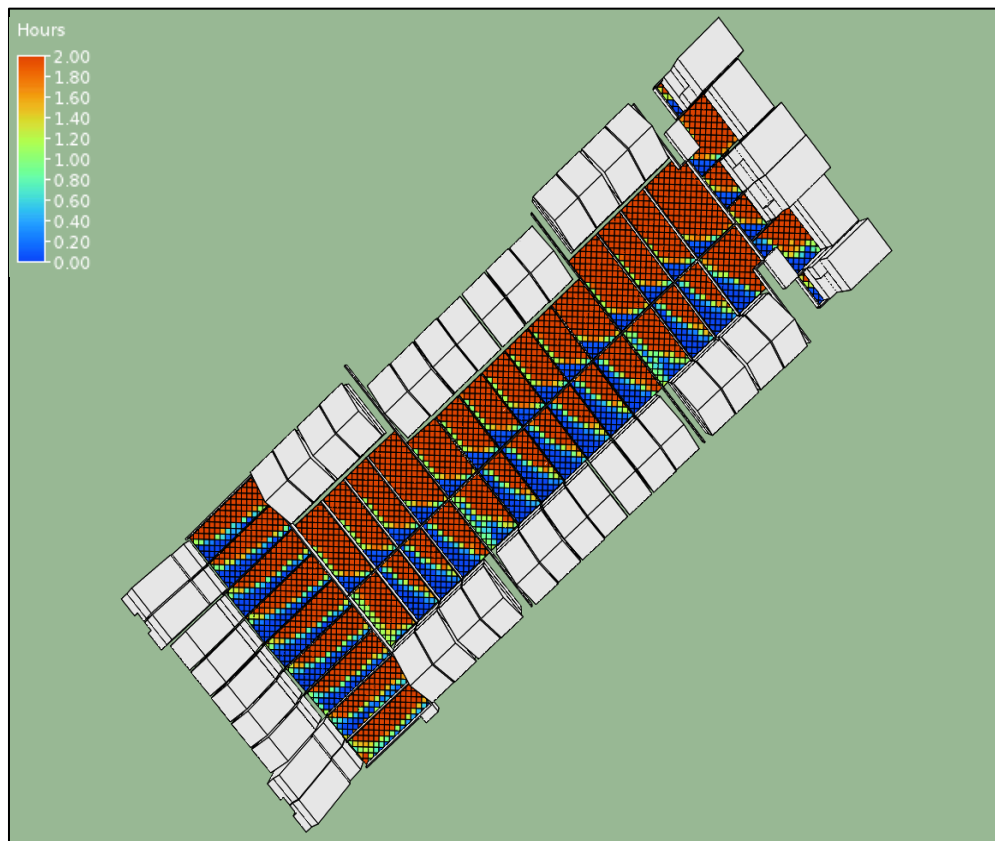
In addition to private amenity space, extensive areas of communal open space have also been provided as part of the development for all future occupants. The analysis has demonstrated that 100% of these areas receive 2 hours of sunlight on 21<sup>st</sup> March, demonstrating that excellent levels of sunlight will be realised in these areas to which the residents have full access.

#### **Sunlight Impact Results Analysed for Private Amenity Spaces – Gardens**

The sunlight analysis has been undertaken in IES VE 3D modelling software package. The entire development along with amenity spaces has been constructed within the software.

The analysis for a selection of plots across the development are presented in the images below and are taken from the software. The plots presented are representative of the development and depict the range of plot orientations across the development.

The red squares presented in the images represent the areas that are receiving 2 or more hours of sunlight on the 21<sup>st</sup> March.



**Figure 10.8** – Sycamore Plot 4B/3 - 2 hours sunlight analysis 21<sup>st</sup> March

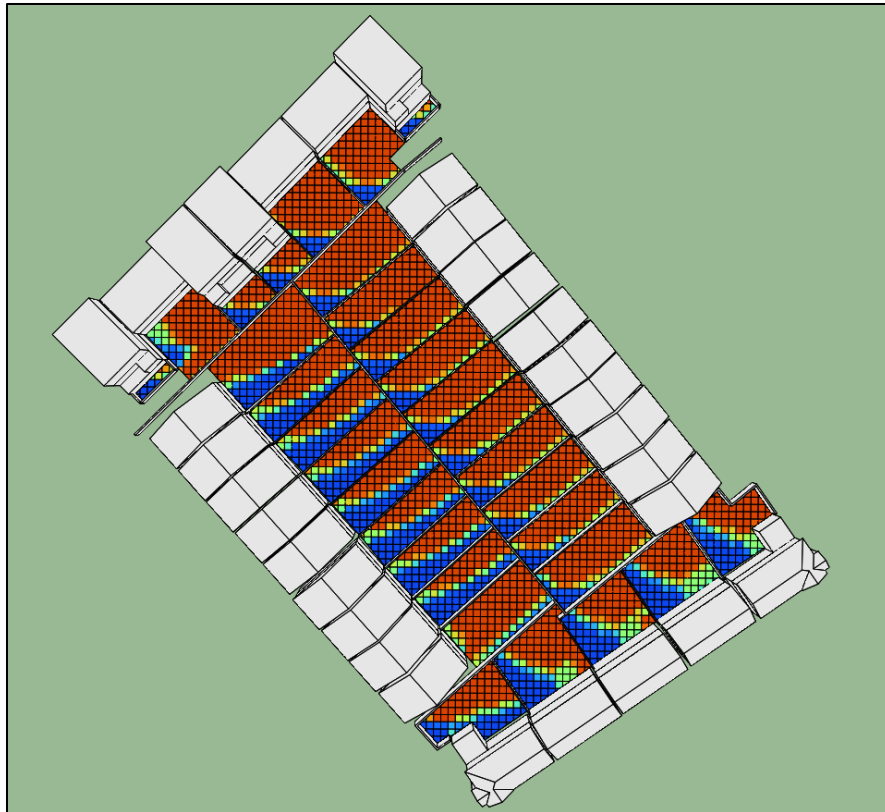


Figure 10.9 – Sycamore Plot 3A/4 - 2 hours sunlight analysis 21<sup>st</sup> March

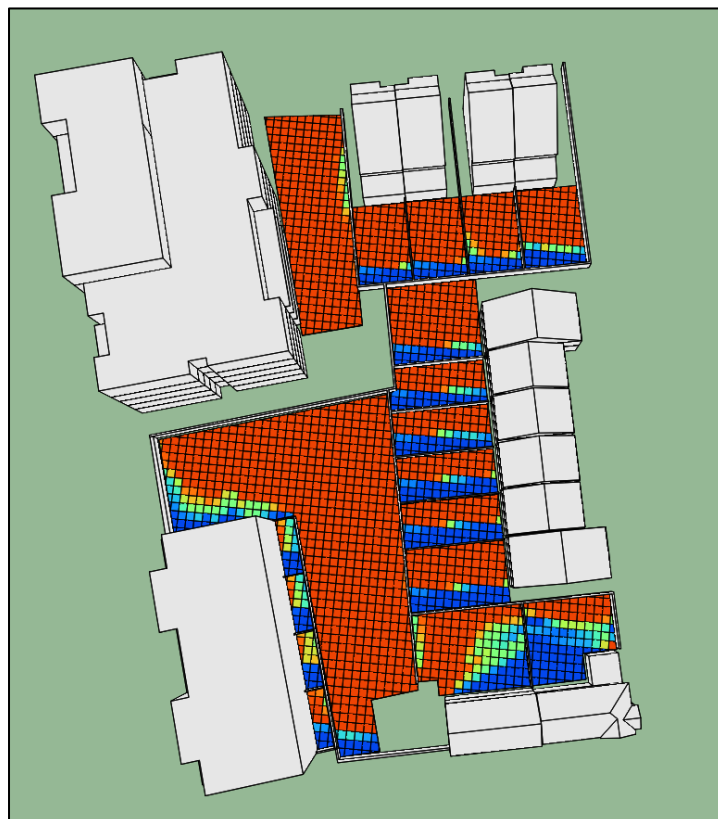
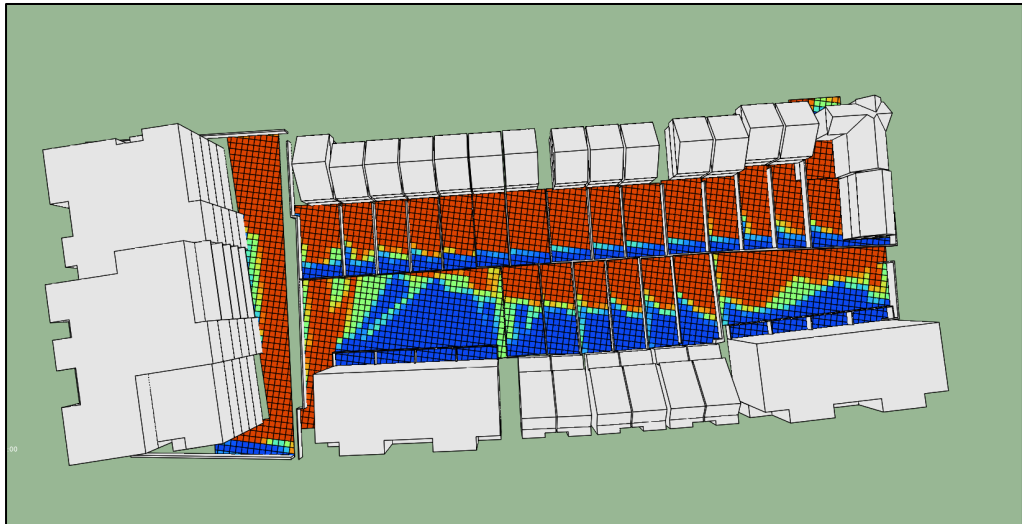
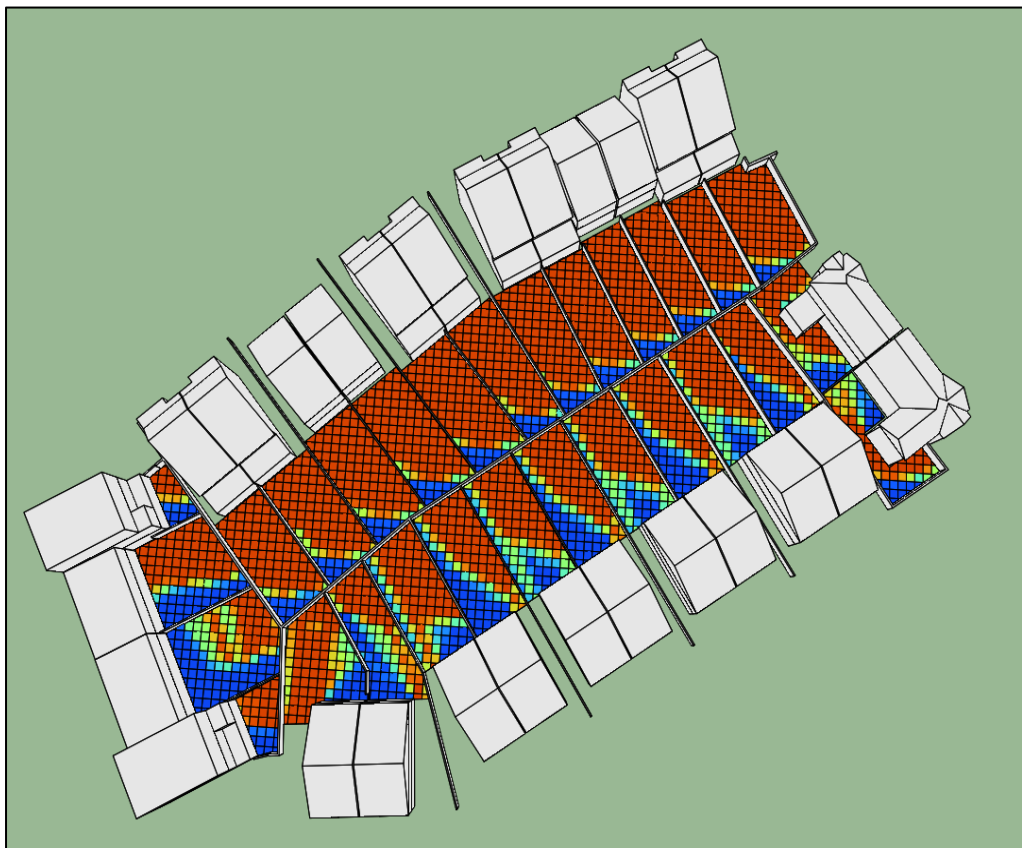


Figure 10.10 – Lime Plot 1B/1 - 2 hours sunlight analysis 21<sup>st</sup> March



**Figure 10.11** – Lime Plot 1B/3 - 2 hours sunlight analysis 21<sup>st</sup> March



**Figure 10.12** – Lime Plot 3B/2 - 2 hours sunlight analysis 21<sup>st</sup> March

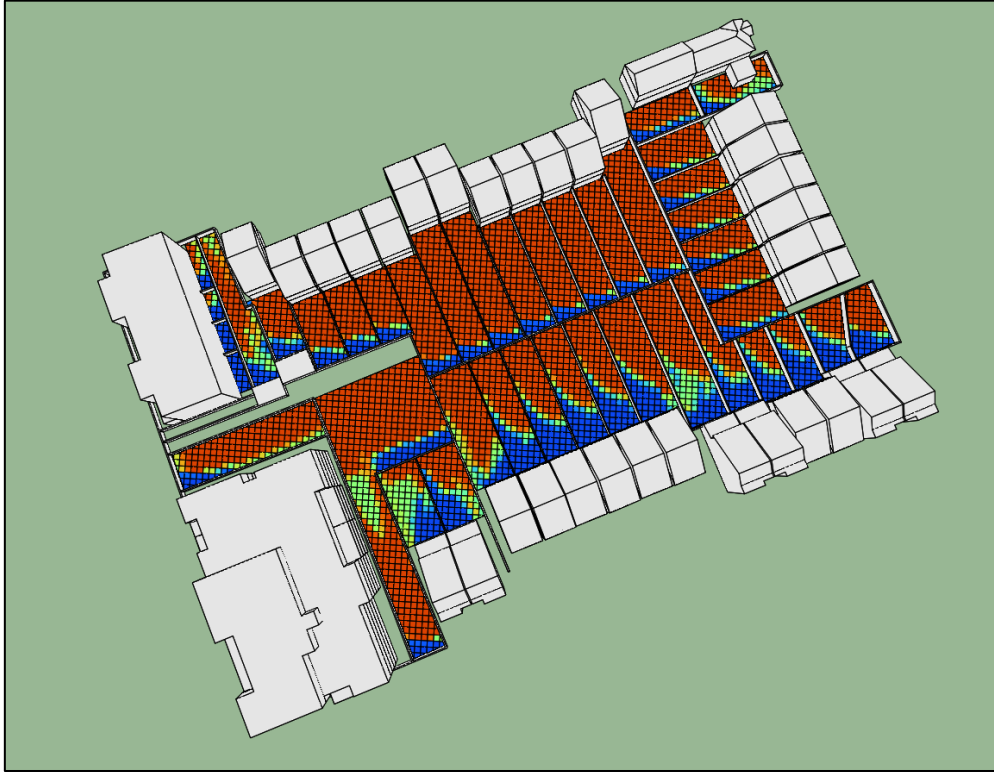


Figure 10.13 – Oak Plot 1A/1- 2 hours sunlight analysis 21<sup>st</sup> March

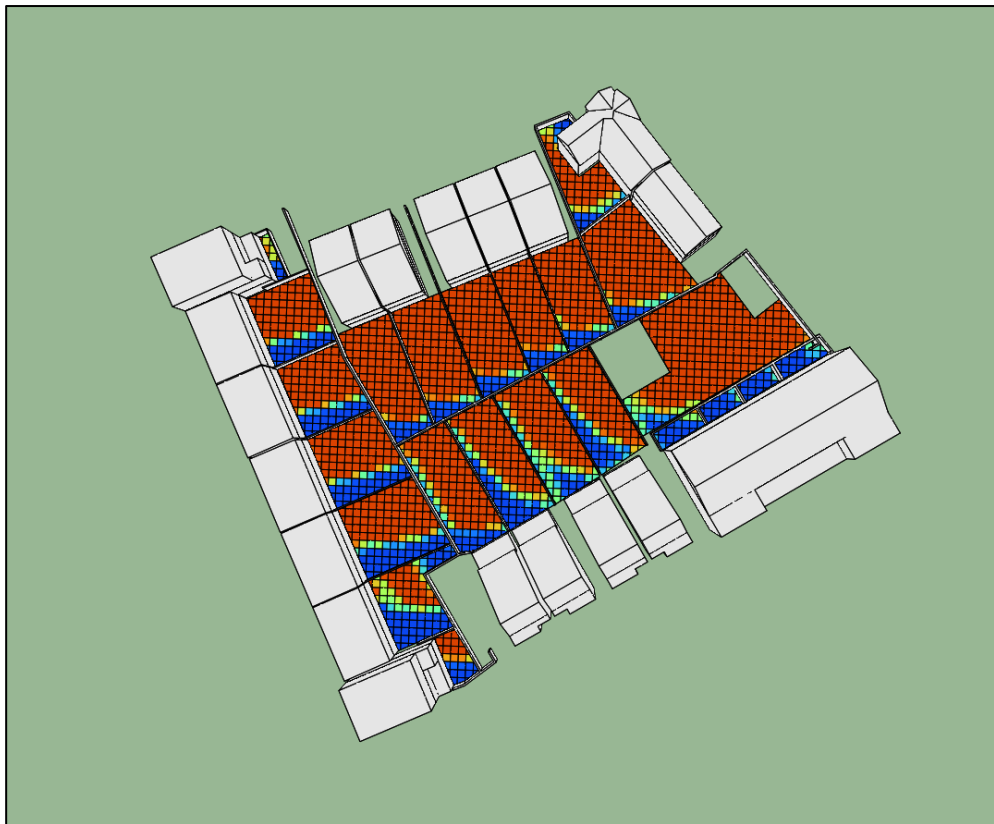


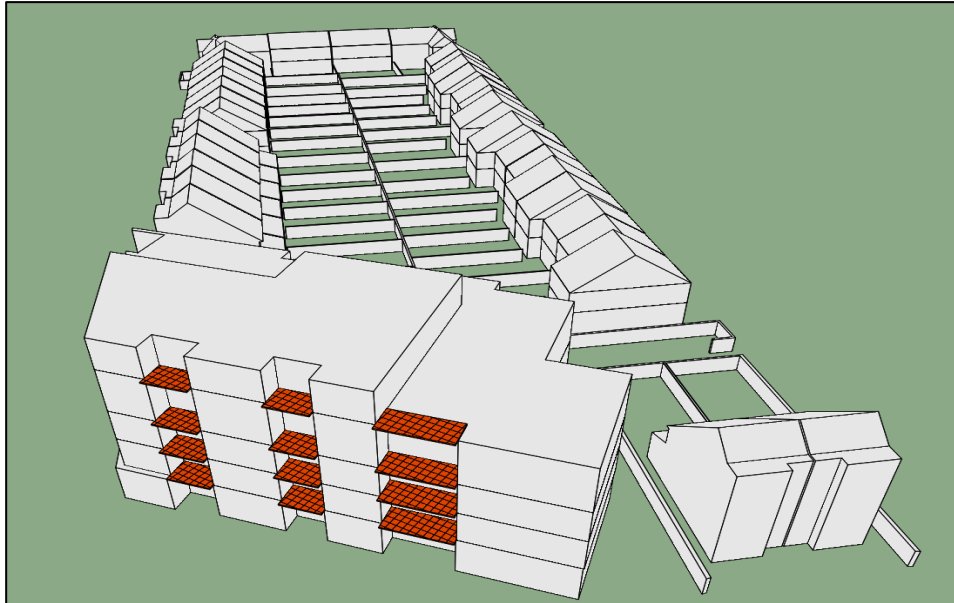
Figure 10.14 – Oak Plot 3A/2 - 2 hours sunlight analysis 21<sup>st</sup> March

### Sunlight Impact Results for Private Amenity Space - Balconies

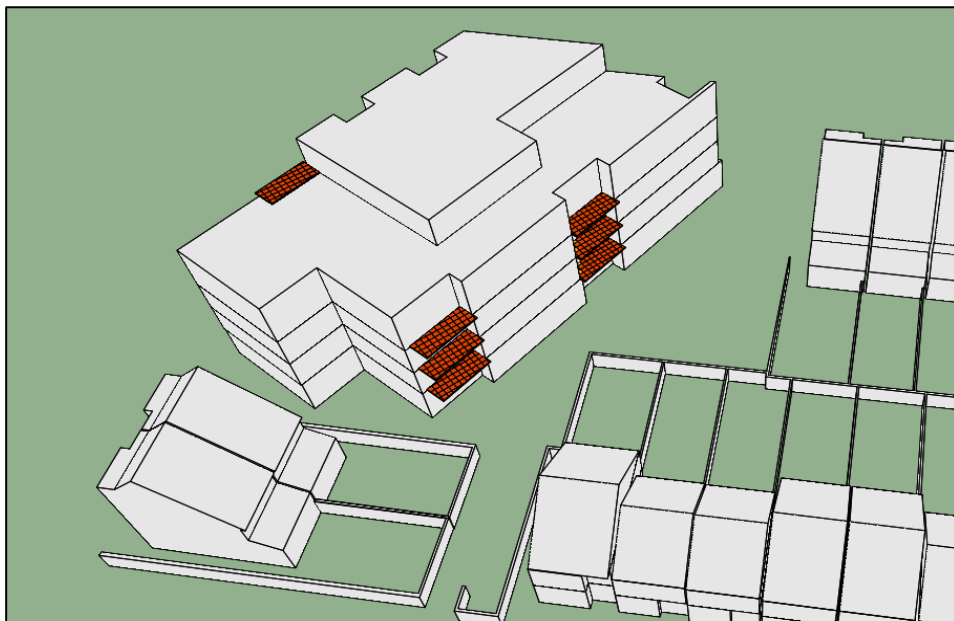
The sunlight analysis has been undertaken in IES VE 3D modelling software package. The entire development along with amenity spaces has been constructed within the software.

The analysis for Apartment Block 2, Duplex Block 2, Duplex Block 5 and Duplex Type N are presented in the images below and are taken from the software. The balconies presented are indicative of the results across the development.

The red squares presented in the images represent the areas that are receiving 2 or more hours of sunlight on the 21st March.



**Figure 10.15** – Apartment Block 2 West Balconies - 2 hours sunlight analysis 21<sup>st</sup> March



**Figure 10.16** – Apartment Block 2 East Balconies - 2 hours sunlight analysis 21<sup>st</sup> March

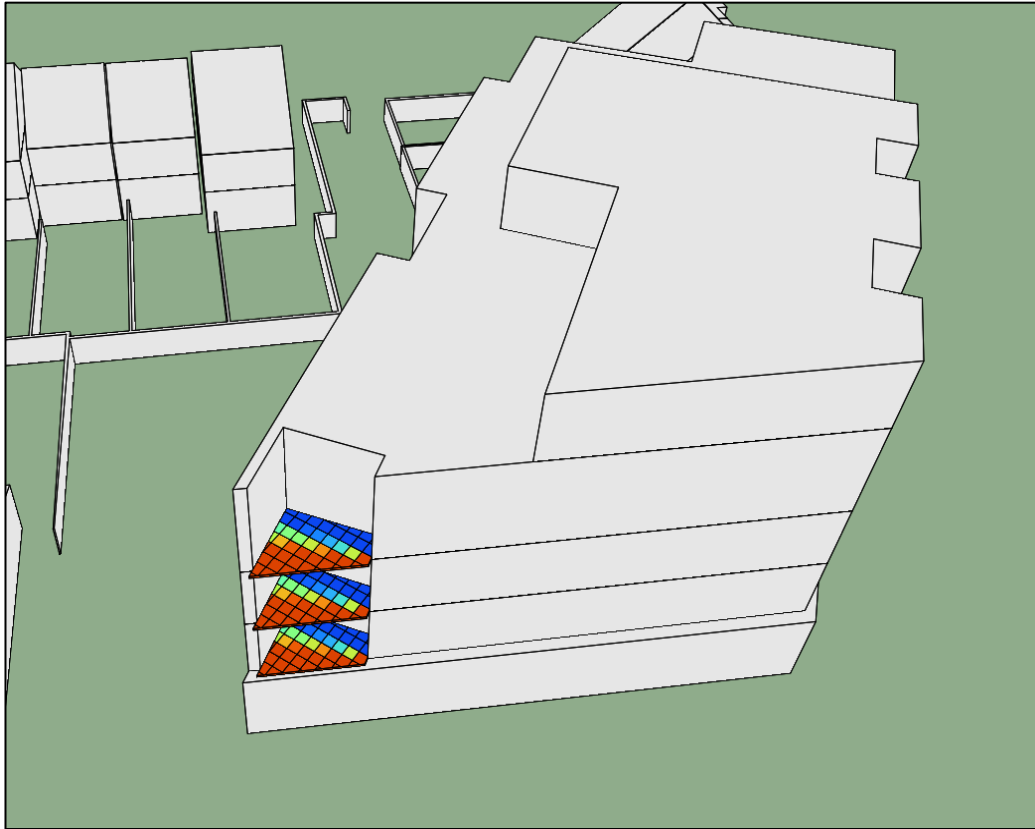


Figure 10.17 – Apartment Block 2 North Balconies - 2 hours sunlight analysis 21<sup>st</sup> March

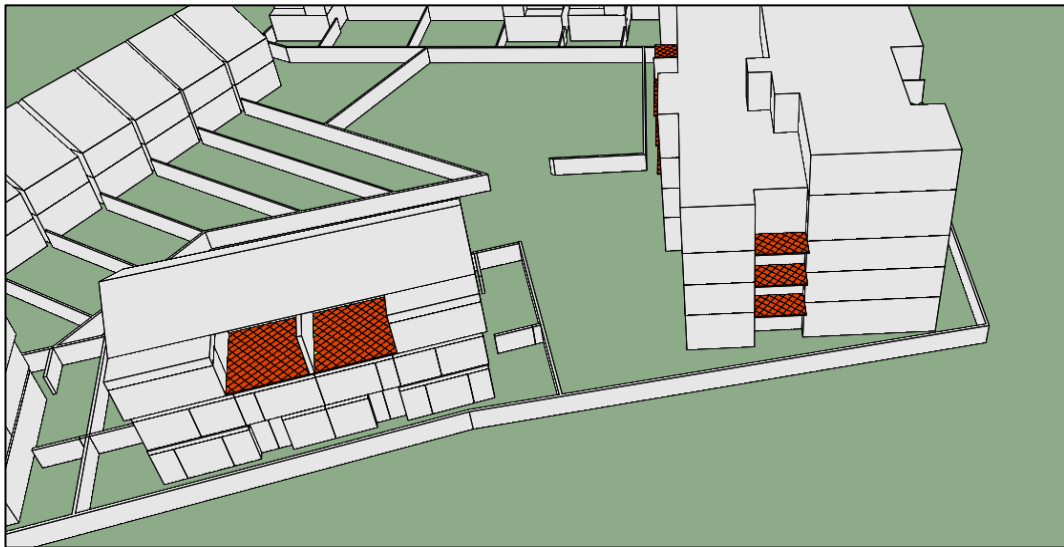


Figure 10.18 – Duplex Block 3 Terrace - 2 hours sunlight analysis 21<sup>st</sup> March

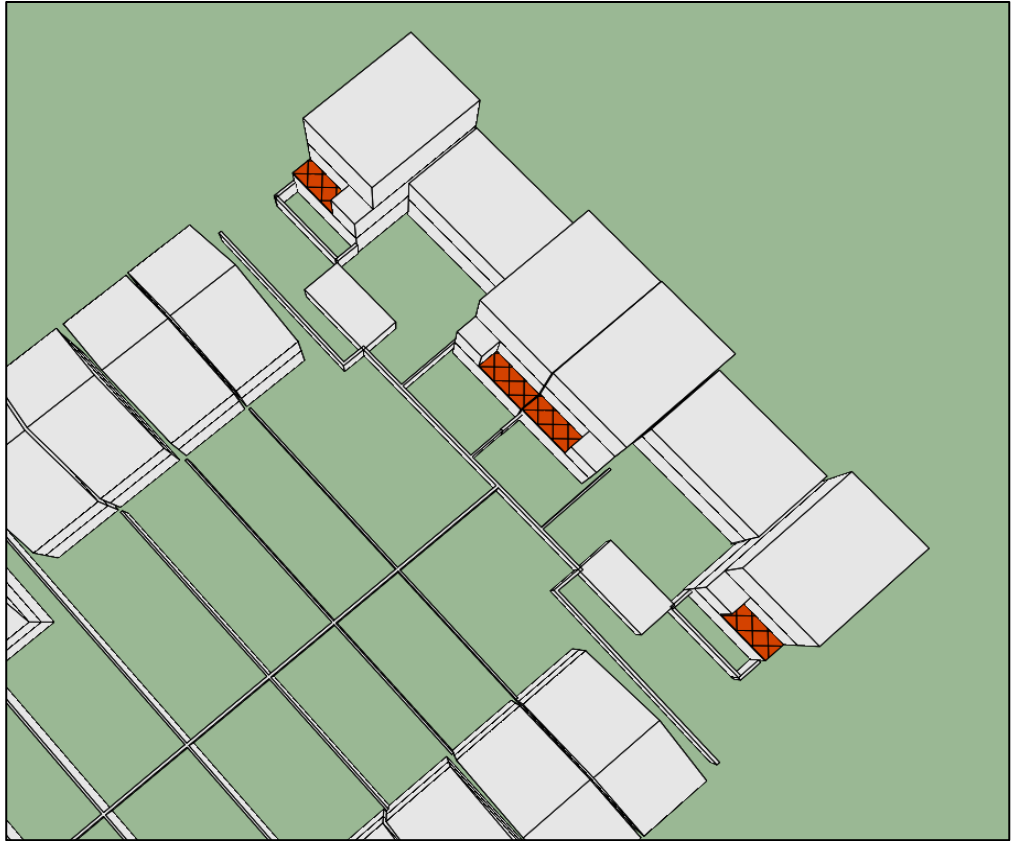


Figure 10.19 – Plot 4B2 / 4B3 Type N Duplex Balconies - 2 hours sunlight analysis 21<sup>st</sup> March

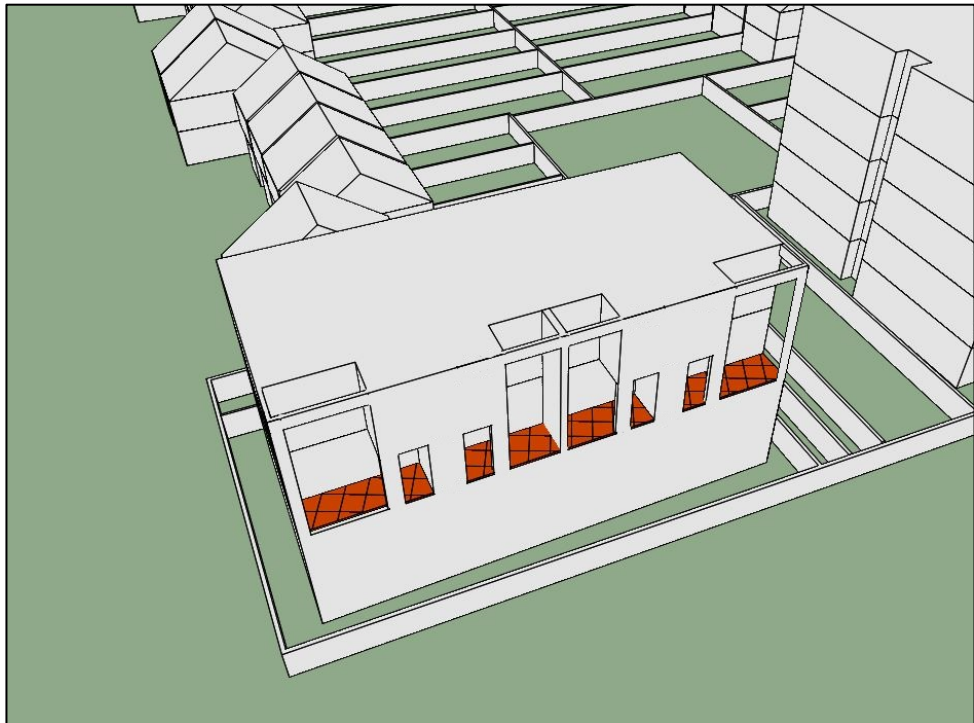


Figure 10.20 – Plot 3A/2 Type L2 & L3 Duplex Balconies - 2 hours sunlight analysis 21<sup>st</sup> March

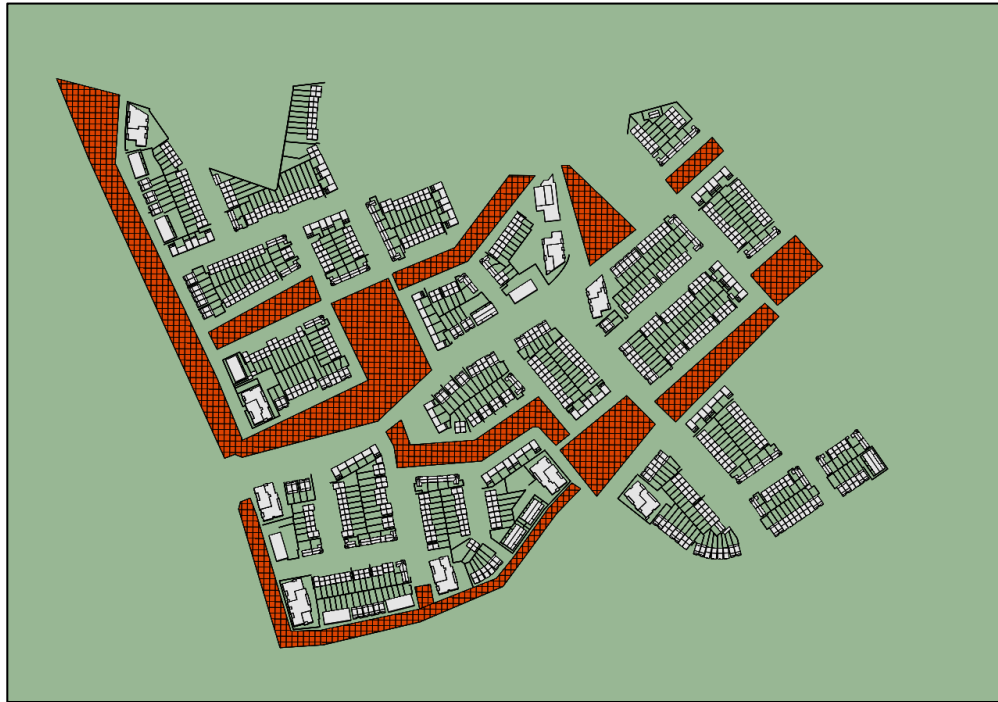


### Sunlight Impact Results for Communal Amenity Space

The sunlight analysis has been undertaken in IES VE 3D modelling software package. The entire development along with amenity spaces has been constructed within the software.

The analysis undertaken for the communal open spaces is presented in Figure 10.21.

The red squares presented in the image represent the areas that are receiving 2 or more hours of sunlight on the 21<sup>st</sup> March. As can be seen from Figure 10.21, 100% of the communal open space areas are receiving a minimum of 2 hours of sunlight on the 21<sup>st</sup> March.



**Figure 10.21** – Communal Amenity Spaces - 2 hours sunlight analysis 21<sup>st</sup> March

#### 10.5.1.3 Do-Nothing Impact

The proposed site is located in an area zoned under the current County Development Plan 2016-2022 for the provision of new residential communities in accordance with approved area plans, and a master plan has been approved for the site by South Dublin County Council.

If this particular development was not to proceed, it is likely that a similar development would be developed at the site, with the same potential impacts to sunlight as the proposed development.

#### 10.5.2 Cumulative – Kilcarbery

In the context of sunlight, the longer term cumulative impacts are considered not significant as the sunlight assessment has shown that the vast majority of private amenity space and all communal open spaces provided as part of the development comply with the BRE Guidelines for sunlight both within the proposed development and in relation to adjacent properties.

#### 10.5.2.1 Do-Nothing Impact

The proposed site is located in an area zoned under the current County Development Plan 2016-2022 for the provision of new residential communities in accordance with approved area plans, and a master plan has been approved for the site by South Dublin County Council.

If this particular development was not to proceed, it is likely that a similar development would be developed at the site, with the same potential impacts to sunlight as the proposed development.

### 10.6 Ameliorative, Remedial or Reductive Measures

#### 10.6.1 Proposed Development

##### 10.6.1.1 Construction Stage

Remedial measures during the construction phase in relation to sunlight are not considered to be required.

##### 10.6.1.2 Operational Stage

As previously noted the performance targets set out in the BRE Guidelines should be used with a degree of flexibility as per the extract below from the BRE Guide:

*“The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numeral guidelines these should be interpreted flexibly because natural lighting [and sunlight] is only one of the many factors in site layout design.”*

The development layout has been arranged so that all green open spaces and green loops are fully addressed by residential frontages to ensure a secure public realm with passive overlooking, which has led to the block layout arrangement with varying orientations across the development. North facing amenity spaces have been limited as far as possible and the net residential density for the site is c. 42 no. units per Ha, which is compliant with the Masterplan net residential density range of 35 – 50 unit per Ha.

In summary, 82% of private amenity areas receive a minimum of 2 hours of sunlight on the 21st March on 50% of the amenity space. Those that fall slightly short of the 50% are predominantly spaces orientated to the north, however, it should be noted that beyond the 21st March sunlight access to private amenity space continues to improve and excellent access to sunlight is experienced across the development during summer months when amenity space will predominantly be used.

Other aspects to consider that contribute to the shortfall are privacy and security requirements for the development. Back garden fencing has been designed as 1.8m high, for privacy and overlooking requirements. The fences do impact on sunlight access to the spaces on the 21st March given the lower angle of the sun, however in later months where the angle of the sun is higher minimal impact from the fencing is apparent.

In addition to private amenity space, extensive areas of communal open space has also been provided as part of the development for all future occupants, and analysis has demonstrated that 100% of these areas receive 2 hours of sunlight on 21st March, demonstrating that excellent levels of sunlight will be realised in these areas to which the residents have full access.

In considering all of the above, minimal impact, if any, is expected in relation to sunlight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore no remedial or reductive measures are considered to be required.

## **10.6.2 Cumulative – Kilcarbery**

### **10.6.2.1 Construction Stage**

Remedial measures during the construction phase in relation to daylight and sunlight are not considered to be required.

### **10.6.2.2 Operational Stage**

Minimal impact, if any, is expected in relation to the sunlight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore no remedial or reductive measures are considered to be required.

## **10.7 Residual Impact of the Proposed Development**

### **10.7.1 Proposed Development**

#### **10.7.1.1 Construction Stage**

Minimal impact, if any, is expected in relation to the sunlight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore it is considered there will be no residual impacts from the construction stage in respect of sunlight.

#### **10.7.1.2 Operational Stage**

Minimal impact, if any, is expected in relation to the sunlight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore it is considered there will be no residual impacts during the operational stage in respect of sunlight.

## **10.8 Monitoring**

No on-going monitoring is required in relation to daylight and sunlight.

## **10.9 Reinstatement**

If all grounds are reinstated as per the proposed design no impacts in relation to daylight and sunlight are perceived.